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ABSTRACT

Population issues are interconnected to many of the most pressing concerns of today, nine of which are addressed on the front of the wallchart included in this guide. The activities in this guide allow students to explore these topics in order to better understand the significance of our current demographic milestone for society and the environment. Each activity requires little preparation but guarantees memorable classroom experiences. Some are designed for a quick lesson on such concepts as land use patterns or motivations behind family size while others offer students more extended opportunities for research and writing. (SAH)

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YOUR STUDENTS CAN DISCOVER WHY NATIONAL GEOGRAPHIC SAYS "POPULATION GROWTH MAY BE THE MOST PRESSING ISSUE WE FACE AS WE ENTER THE NEW MILLENNIUM."

A World of Six Billion

Wall Chart and Activity Guide

ED 448 025

...THOUGHT PROVOKING ACTIVITIES ON POPULATION, RESOURCES, AND OUR ENVIRONMENT.

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Count up from six billion with your students...

Population issues are interconnected to many of the most pressing concerns of our time, nine of which are addressed on the front of the wallchart. The activities in this guide allow students to explore these topics, and so doing, to better understand the significance of our current demographic milestone for our society and our environment. Each activity requires little preparation, but guarantees memorable classroom experiences. Some are designed for a quick lesson on such concepts as land use patterns or the motivations behind family size. Others offer your students more extended opportunities for research and writing.

ZPG's Population Education Program has developed a wealth of additional activities, available through our curriculum guides and demonstrated in our teacher training workshops. These activities are designed to help you meet the standards established by the National Council for the Social Studies, the National Center for History in the Schools, and the National Council for Geographic Education. We welcome your comments, and wish you a thoughtful commemoration of this demographic milestone. For more classroom ideas, visit us online, at www.zpg.org, or call to request our latest catalog, at 1-800-767-1956.

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Key Information

A primer to the nine critical issues on the wall chart, and their connection to population.

1. The Numbers Game

Rapid population growth is new in the scope of human history. Until about 1800, world population grew slowly. But in the late 1700s and 1800s, thanks to improved medicine, sanitation, nutrition, and farming techniques, our population began to increase faster. World population reached 1 billion in 1800, and climbed to 2 billion in 1930. In 1960 our population reached three billion – half of what it is today!

At our current growth rate of 1.4% per year, the world's population would double to reach 12 billion in only about 50 years. The United States' population is expected to double in around 120 years. At this rate, we are the fastest growing industrialized nation in the world, and we have the third largest population of all nations, preceded only by China and India.

Many people equate overpopulation with crowding, but density is less important than carrying capacity, the number of a given species that an area can support without impairing the environment. By this standard, many parts of the planet are already overpopulated.

2. Munch, Munch: A Consumer Society

There are always different sides to a story, and the issue of population growth is no exception. On one hand, there is an increasing number of people on the planet. We will need to find a way to meet the basic needs of these six billion people, including securing adequate food, water, shelter, and waste disposal. The other side of the story is that some people maintain a lifestyle beyond basic needs. People in developed countries, especially in North America, use so many resources that, although our populations are relatively small, we have a hugely disproportionate impact on the Earth. Americans may make up five percent of the world's population, but we use 25% of the world's resources. Our consumer culture tells us to throw away our old things in favor of the newer, better and faster models. The humbling fact is that the Earth could not sustain six billion people consuming resources at the rate we do in North America.

3. Many a Mouth to Feed

Our global society has worked for many years to end world hunger, and great progress has been made towards that goal, especially by increasing crop yields. However, yields have not been increasing enough to keep up with population growth. In order to meet the food needs of the growing population, farmers must use their land more intensively, depleting the soil, or they must find new land to farm, by clearing forests or other areas.

When we think of hunger, we usually think of starving people in Africa, experiencing famines brought about by drought or war. Yet, while food seems abundant in the U.S., many Americans do not have food security, a consistent supply of the foods needed to live a healthy and productive life. In fact, one in ten Americans relies on the government or charity as a food source at some time in their lives.

4. For Rich or for Poor

When it comes to population, it's not just how many people there are, it's how resources are distributed among them. In the world today, enormous wealth and vast poverty often live side by side. In general, people living in the developed world (the United States, Canada, Japan, and Western Europe) have smaller populations but use far more resources (such as food, energy, metal, wood) and create far more waste than their cousins in the more populous, and more impoverished, developing countries.

Experts say that people in developing countries will slow their population growth as their economies grow. Foreign aid is one way to help developing countries strengthen their economies. As a country, we could make development assistance a greater priority.

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Key Info

5. Women of the World

"Women hold up half the sky," reads an old Chinese saying. Indeed, women have traditionally been the world's farmers, childbearers and caretakers of young and old — the backbone of families and societies. Despite their contributions to humanity, women continue to suffer from gender discrimination in much of the world. Being born female in much of the world means a lifetime as a second-class citizen, denied most of the opportunities available to males in the areas of health, education, employment, and legal rights. This second-class citizenship hurts, first and foremost, the well-being of women themselves; however, it is also a major contributor to rapid rates of population growth in the world.

6. Healthy Bodies/Educated Minds

It has sometimes been said that the most important thing you can have is your health. And that the best investment you can make is in an education. But in much of the world, good health and a basic education are luxuries that many people simply cannot afford. Improving the health and educational status of the world's people is not only important so that we can ALL live fuller lives, but also important in slowing population growth rates and improving the environment. A lot of progress has been made, but we still have a long way to go!

7. A Greenhouse Planet

Oil, coal and natural gas power our automobiles, heat our homes, provide electricity for our appliances and allow us to enjoy a standard of living unprecedented in history. However, when burned, these carbon-based fuels combine with oxygen to form carbon dioxide (CO_2). As a result of increased industrialization and growing population, more and more carbon has been emitted into the atmosphere. CO_2 levels are now at their highest point in 150,000 years. The gas acts like a blanket, trapping Earth's heat energy and preventing it from passing through to space. The process works much the way a greenhouse would, hence its name.

Over the past century, the average surface temperature of the Earth has increased 0.5 to 1.1 degrees Fahrenheit. Scientists are warning that society must take immediate action to avert disastrous consequences. The United States is by far the biggest producer of greenhouse gases, but emissions in developing countries are increasing faster, because of their rapid population growth.

8. Down the Drain

As the world's population escalates, so does the demand for water. Population growth and economic expansion have caused global withdrawals of fresh water to more than quadruple between 1940 and 1990. The 1996 United Nations Human Development Report found that nearly 1.3 billion people in the developing world still lack access to safe water, and efforts to supply it are falling behind population growth rates. According to the head of the International Irrigation Management Institute, stabilizing population is the most important thing policy makers can do to slow down the decline in available water per person.

9. The Endangered Ark

In just a few decades, humans have brought about the extinction of untold numbers of species and many more are now endangered. If trends hold true, extinction is a very real possibility for a quarter of all species.

The single biggest threat contributing to the premature extinction of plants and animals is habitat alteration. Other causes of species endangerment include pollution, over-harvesting, and introduction or invasion of non-native species. Growth in human population is a leading cause of habitat destruction. As human numbers increase, more land is developed, destroying crucial wildlife habitat, and squeezing species into smaller and fragmented areas.

Many people believe that it is morally wrong to drive species into extinction. Closer to home, when we protect species, we protect ourselves. Scientists tell us that by safeguarding biodiversity, the variety of life on our planet, we protect our supplies of food, water, and naturally-derived medicines, and maintain the balance of nature.

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Pop Goes the Planet

Population Simulations

Six billion is such a large number, it is often difficult for students to conceptualize. These brief simulations help students appreciate the magnitude of the number, as applied to real-life concepts like the historical rate of population growth, current worldwide birth rates, and family size choice.

Pop Circle

Mark off a circle on the floor about six feet in diameter. Ask two students to stand in the circle to represent the world's population in the year 1550 (one student = 250 million people). Ask one student to be a time-keeper. With each second, assume one year has elapsed. Add students to the circle according to the table below:

YEAR	WORLD POPULATION	TOTAL IN CIRCLE (250 MILLION)	INTERVAL TO NEXT DATE	AND PAUSE/WAIT AT END OF CUMULATIVE INTERVAL	NUMBER OF STUDENTS TO ADD
1550	500,000,000	2	200 YEARS	3 MINS, 20 SECS	1
1750	750,000,000	3	60 YEARS	1 MIN	1
1810	1,000,000,000	4	90 YEARS	1 MIN 20 SECS	2
1986	1,500,000,000	6	41 YEARS	41 SECS	2
1927	2,000,000,000	8	22 YEARS	22 SECS	2
1950	2,500,000,000	10	10 YEARS	10 SECS	2
1960	3,000,000,000	12	15 YEARS	15 SECS	4
1975	4,000,000,000	16	12 YEARS	12 SECS	4
1987	5,000,000,000	20	12 YEARS	12 SECS	4
1999	6,000,000,000	24			

Discuss the trends that emerged *(population growth increased rapidly, recently, the rate of growth has stopped increasing, but the number of people in the circle continues to increase steadily)*.

Feel the Rhythm

Take a metronome and set it at 168 ticks per minute. Tell students that another person is added to the world with each tick. For historical perspective, you might tell students that when Columbus found the Americas in 1492, the world population was relatively stable, growing by about one million people per year, or two ticks per minute.

As death rates dropped dramatically after the Industrial Revolution, human populations began to grow. By 1940, we were adding 40 people per minute (the slowest setting on the metronome); 88 per minute by 1950; 138 per minute by 1970; and 168 per minute today. Our rate of growth has actually slowed: just five years ago, it stood at 176 per minute.

It's a Toss Up

Many students want a certain number of boys and/or girls when they have children. But, what happens if they don't get a girl and a boy right away? Begin by asking each student to write down how many boys and/or girls they would like to have. Next, ask them to flip a coin. A throw of "heads" signifies a girl; "tails" means a boy. The student should decide whether they want to flip again, or to stop with the number they have. Allow students to keep flipping the coin until they have a number and sex ratio of children that they are satisfied with. Students should record each coin toss.

Once everyone has finished tossing their coin, ask students to calculate the average number of children the class "had." Compare this figure with the average number of children the students originally said they wanted to have. Chances are that the "actual" number of children will be higher than the original average number of "desired" children.

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Baby-O-Matic

Concept

The number of children each of us has is closely correlated to our lifestyles and the norms of our society. Students examine several such factors, and use their responses to determine how many children they, or someone of their background, would likely have.

Procedure

Distribute the worksheet to your students. Allow a few minutes for the students to individually answer the questions and calculate their results. Go over the discussion questions with the class.

Discussion

A. How many children did each of your students come up with? What was the class average?

B. Go over these notes below with your students. Each number corresponds to a question on their worksheet. You may wish to frame the notes as questions (e.g. Why do you think that this is a factor?)

1. Family life

The number of children a woman bears varies with her status in the household. Women who are able to play a part in important decisions often choose to have fewer children. In some cultures, women don't have any say about the number of children they bear.

2. Education

The more education a person has had, the fewer children they typically bear. As one indicator, people who are literate have fewer children than those who can't read.

3. Social security

People tend to have more children if they see no other way of supporting themselves in old age.

4. Status symbols

In many cultures, large families are important status symbols. In other areas, our personal successes better represent our status in society.

5. Time and money management

In some cultures, children are considered a drain on their parents' time and money. In other cultures, each child represents an additional worker that can help support the household, or enable the parents to get more work done.

6. Health

People often have larger families as insurance when they are unsure whether their children will survive their childhood. In the United States, for example, an average of 7 children out of 1,000 die in infancy. Compare this to the West African country of Sierra Leone, where out of 1,000 children, 157 die in infancy (more than 1 in 6).

7. Personal beliefs

Societal pressures often pull people towards having very large or small families. When people are able to make their own decisions about how many children to have, as in North America, the number approaches two per couple.

8. Timing

The longer people wait before starting their families, the fewer children they will have. This is partly owing to our "biological clocks." Also, people who choose to wait longer to have children often build careers for themselves, and so their priorities change.

C. Did any students think the BABY-O-MATIC gave them the wrong answer? (It is often possible to find variations among individual cases. A person with little schooling, for example, could conceivably have a small family. However, taken in total, statistics bear each of these factors out.)

Follow-up Activity

Assign each of your students a different country, so that they can conduct research into the lives of people there. Have your students retake the quiz, this time from the perspective of a person in their assigned countries. What changes have they observed? How do their calculations compare to the actual demographic data from that country?

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Baby-O-Matic

STUDENT WORKSHEET

Want to know how many children you'll have? Take the BABY-O-MATIC Quiz!

For each number, circle the statement that best describes you and your lifestyle:

1. Family life

A. I plan never to marry.
B. When I marry, both I and my spouse will share in important decisions.
C. When I marry, only the man in the couple will make important decisions.

2. Education

A. I don't know how to read, and I don't expect I will ever learn.
B. I know how to read, but I do not expect to graduate from high school.
C. I will definitely finish high school, and may continue my formal education.

3. Social security

A. When I grow old, or am unable to work, I expect my family to provide for me.
B. I hope to rely on my personal savings, when I grow old, or am unable to work.
C. When I grow old, or am unable to work, the government will take care of me.

4. Status symbols

A. I believe that the position I hold in the workplace, and the money that I accumulate in life are the most important gauges of how successful I have been.
B. A large family is much more important to me than a successful career.
C. My status in the workplace is important to me, but family is equally important.

5. Time and money management

A. Raising children takes a lot of time and money, and I would rather be doing other things with those resources.
B. Raising children may be expensive, but is something that I want to do with my life.
C. My children will be very useful to me as workers, and will help support the family.

6. Health

A. If I have children, I'd expect them to have long, full lives.
B. If I have children, there is a good chance that they wouldn't live very long.

7. Personal beliefs

A. I have been taught that my responsibility in life is to have as many children as I can, and I intend to do just that.
B. I believe that no one should tell me how many children I should have. That decision is for me and my spouse to make.
C. I believe that the world just has too many people, and we'd all be better off if there were fewer.

8. Timing

A. I'd like to be a parent by the time I turn 20.
B. If I'm not a parent by the time I turn 40, no problem.
C. I'd like to be a parent by the time I turn 35.

Give yourself points as follows:

1. A1; B2; C3
2. A3; B3; C2
3. A3; B2; C2
4. A1; B3; C2
5. A1; B2; C3
6. A2; B3
7. A3; B2; C1
8. A3; B1; C2

Your Score

11	0 children
12-14	1 child
15-17	2 children
18	3 children
19-24	4 or more children

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Needs ←vs.→ Wants

Concept

Students differentiate necessities from luxuries in order to consider resource consumption in our society.

Introduction

In North America, we live in a culture that emphasizes abundance. Students are constantly exposed to messages that tell them to want and seek more material goods. In such an environment, it can be difficult for them to appreciate what they already have, much less understand what it means to live with less. In this activity, students clarify the difference between needs and wants, reevaluate their consumption patterns, and determine what they would be willing to sacrifice to accommodate others.

Sample Chart

Basic Necessities	My Needs or Wants	
food	stereo	(oil--for plastic, electricity, steel)
water	TV	(metal, oil--for plastic, glass, electricity)
shelter	fast food hamburger	(grain, pesticide, oil, fertilizer, wood, metal, beef)
clothing	hot water	(water, oil or gas, copper, lead, iron)

Procedure

1. Instruct students to draw a line lengthwise down the middle of a sheet of paper. Students can work individually or in small groups.

2. On the left side they will list the basic needs of every human being: water, food, clothing, shelter, etc.

3. On the right, they will list the things they need or want for their own lifestyles: TV, stereo, video game system, car, fast food, movies, hot water, etc. Next to each item, they should name some of the resources or products needed to produce, use, and maintain these things: oil (for plastic and fuel), electricity, iron, aluminum, pesticides, grain, water, etc. Give the students enough time to writ 10-15 items.

Note: The teacher may want to go through some of th examples of products we use regularly, and the resource they are made from or use to operate, to get student started.

4. Tell them to select three items on the right that they would be willing to give up so that people who currently lack the basic necessities (listed on the left) can survive. Have them cross those items off their lists.

5. Tell the students to select an additional three items. Have them cross those items off their lists.

6. Continue to have students cross out items until they only have a few left.

Discussion

1. Which were the first items to go on your list? What did you elect to keep? Why?

2. Do you think that most North Americans would be willing to lower their consumption level to help others in developing countries? Why or why not?

3. Are there any alternatives to giving up those items on your list? What are they? *Sharing, using less of everything, recycling, finding more efficient/less wasteful ways to make or run products.*

4. How do you think that giving up these items on your list would affect your happiness? What makes you the happiest? What do you most enjoy doing? Make a list on the board — *be sure to include items like friends, family, playing sports, reading, singing, playing in a band, etc.*

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Earth: The Apple of Our Eye

Concept

A visual demonstration illustrating the limits to our sources of food.

Materials

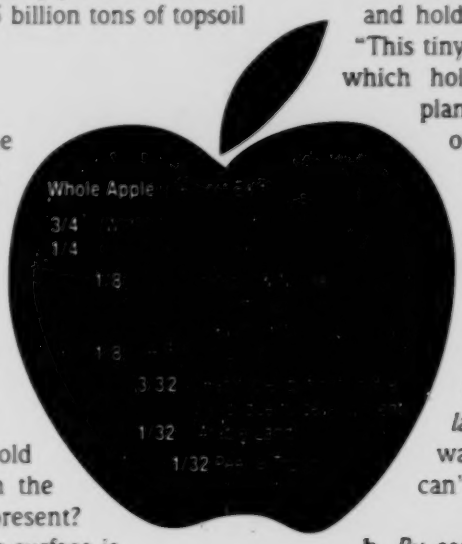
An apple, a knife and a paper towel.

Introduction

Two hundred years ago, most of America's croplands had at least 21 inches of topsoil; today, it is down to around six inches. The U.S. is losing six million acres of prime farmland every ten years—an area roughly equivalent in size to Vermont. Four of those six million acres are lost to urban and suburban expansion. The other two million acres, or one billion tons of topsoil, are lost through erosion caused by deforestation, unsustainable farming practices and animal grazing. Worldwide, we lose 25 billion tons of topsoil per year.

Procedure

Slice the apple according to the instructions, reciting the quoted text (see quick reference box). Use the discussion to encourage critical thinking about these facts.



1. Hold the apple out so the class can see it. "This apple represents our planet."

2. Cut the apple into quarters. Hold out 3/4 in one hand and 1/4 in the other. "What do these 3/4 represent? *(Water)* So, only 1/4 of the Earth's surface is land."

3. Set the 3/4 representing water aside. Slice the remaining 1/4 representing land in half. Take 1/8 in each hand, and hold out one of them. "1/8 of the Earth's surface, or half of all land, is inhospitable to people and to crops: these are the polar regions, deserts, swamps, and high mountains."

4. Set that 1/8 aside and hold out the other. "This 1/8 of the Earth's surface, the other half of all land, represents the total area on which people can live, but can't necessarily grow food."

5. Slice this 1/8 lengthwise into four pieces. Hold out 3/32 in one hand and 1/32 in the other. "Each of these pieces represents 1/32 of Earth's surface. These three represent land that never was arable because it's too rocky, wet, cold, steep or has soil too poor to produce food. They also contain land for our cities, roads, shopping centers, schools, parks, factories, and other developments."

6. Set 3/32 aside and hold out 1/32. "So, only 1/32 of the Earth's surface has the potential to grow the food needed to feed all the people on Earth."

7. Carefully peel the 1/32 slice of Earth, and hold this peel up so they can see it. "This tiny bit of peel represents the topsoil, which holds moisture and nourishes our plants. The U.S. currently loses an inch of topsoil every 16 years, yet it can take nature 500 years to build one inch of topsoil."

Discussion

How can we preserve farmland?

Suggested Answers:

a. *By not building anything on arable land:* Land used for buildings, highways and other forms of development can't be used for growing crops.

b. *By eating lower on the food chain:* While one billion people suffer from malnutrition and starvation, the world's cattle alone (not to mention pigs and chickens) consume a quantity of food equal to the caloric needs of 8.7 billion humans. We devote 56% of U.S. agricultural land to the production of beef.

c. *By reducing pollution:* Pollution impairs the ability of the land and the seas to provide food that's both sufficient in quantity and free of contaminants.

d. *By stabilizing human population growth:* Quite simply, the more people there are to feed, the less food there is to go around. Food supply is an excellent example of the relationship between any resource and the size and consumption patterns of the population that depends on it.

The activity originally appeared in KUITATK, a Native American Science Education Association Issue Publication.

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A Woman's Place

POP TV: Write all about it

When the first human walked on the moon in 1969, nearly every person in America watched it live, glued to the television. But TV coverage did not stop with those first steps. The next television season, many popular shows had an episode featuring the moon landing. In recognition of another historic event, the world population reaching six billion, students develop a plot description, or treatment, for a currently running television show, featuring our population milestone as the theme.

Procedure

Students may wish to conduct research into their chosen program, and the issue of population growth, so that they can craft a treatment where the characters are portrayed as they would be on the show. Characters should reflect on living in a world of six billion, explore challenges posed by continued population growth, and describe possible ways to meet those challenges in ways that are realistic and humane. Look for students to show an understanding of population issues, in ways that would be thought-provoking, original, and entertaining for a television viewer to watch.

Suggested Guidelines

Length: 1,000 words or less, should be sufficient to produce a professional quality treatment.
Voice: Third person, present tense.
Style: Plot treatments are narrative descriptions, not completed scripts, which can take much longer to write.
Examples: Show your students what high-schoolers can write. Download the winning essays from ZPG's 1st POP-TV Writing Contest, featured on the Internet at www.zpg.org/education/writingcontest/pastwinners.html

Concept

The status of women around the world is closely linked to fertility rates, as students discover in the following reading and discussion.

Introduction

In every country and culture, women play vital roles in society, but often their contributions are undervalued. Women around the world have made great progress in improving their lives and the lives of their families, but they still face many inequities in political representation, economic well-being, health, and human rights. These inequities affect entire societies, as there is an increasing amount of evidence that improving the status of women is key to improving the health and well-being of families and stabilizing fertility rates around the world. In this activity, students explore the complex relationship between women's status, development, and fertility.

Procedure

1. Give each student a copy of the student reading *Fatima's Story* with the accompanying discussion questions. Explain to the students that *Fatima's Story* is the story of a woman who lives in sub-Saharan Africa but her situation is typical to that of women in many countries in Africa, Asia and Latin America.

2. After the students have had a chance to read *Fatima's Story*, divide the class into small groups and have them answer the discussion questions on the worksheet as a group. Once students have had a chance to discuss each with their group, go over the questions as a class.

Based on the activity, "The Value of a Son, The Value of a Daughter," CEDPA, 1996

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Student Reading: Fatima's Story

Fatima is a mother with five children — the son, Aziz, and four daughters.

Her husband, Jalal Din, is a reliable man and a good father. He and Fatima are farmers and they work hard together in the fields.

They all live together with Jalal Din's mother, who is a widow. She is a good woman, but she is always critical and nags at Fatima. In fact, she talks from early morning until she goes to bed. "When are you going to light the fire? It is broad daylight already!" And, "Wives should obey their husbands." Sometimes she criticizes Fatima for work not done, sometimes for spending too much money. And she always complains that Fatima has produced only one son and burdened her dear Jalal Din with one daughter after another!

Fatima has learned to live with her mother-in-law and to keep her mouth closed. In this way, she is a very dutiful wife and daughter-in-law. But she did do something in secret last month — well, it was a secret between her and Jalal Din — which they didn't tell Jalal Din's mother. Fatima started practicing family planning. The big reason she made this decision was that she wasn't feeling very well. As you know, having 5 children in 9 years can make a woman feel unwell. She has a backache and she is tired most of the time. But she has so much work to do — finding firewood, carrying water, preparing food, washing the family's clothes, working in the fields — when can she rest?

But there was another reason Fatima started using family planning. It was because of her eldest daughter, Zarin. She is the first child — and a lovely little girl, a joy to everyone. Zarin goes to school along with Aziz. Every afternoon she brings her exercise book home and proudly reads to her mother what she has written. She is so happy in school! But Fatima knows that if she has another baby, Zarin must leave school to care for the new baby while Fatima works in the fields. There is simply no other way all the work can be managed. In a way, Zarin knows this too — because she has seen this happen to her little friends. Almost all of them no longer go to school, but instead care for younger brothers and sisters.

Today there is a terrible scene in the house when the family gathers to eat. The old woman is wailing and pulling her hair. They family is alarmed and gather around her where she sits on the floor. Between sobs, she finally tells them what is wrong. At the village well this morning, she talked with an old friend who told her someone had seen Fatima at the family planning clinic.

"You are very bad!" she shouts at Fatima. "And you will pay! You will pay for such wickedness. Now you will have no more sons. And who will care for you in your old age? Aziz is a good boy, but he is only one. A family needs many sons. Think of our name. Who will help Jalal Din in the fields? Who will take care of me, if God forbid, something happens to Jalal Din?"

Jalal Din sits next to his mother and comforts her. And he looks at Fatima as if he doesn't know what to do. Zarin is also looking at Fatima. She knows what this is all about — at least she knows what it will mean to her. There are tears in her eyes.

• • •

Fatima really has a problem. What would you do if you were Fatima?

Discussion:

1. Describe the problem. Consider the perspective of Fatima, Jalal Din, his mother, and also Zarin. Why do Fatima and Jalal Din's views differ from those of his mother? What are some reasons sons are more highly valued than daughters in Fatima's culture?

2. What are the potential solutions to each problem?

3. What are the consequences of each solution?

4. Discuss which character would prefer each solution, and why.

5. What would you do if you were Fatima?

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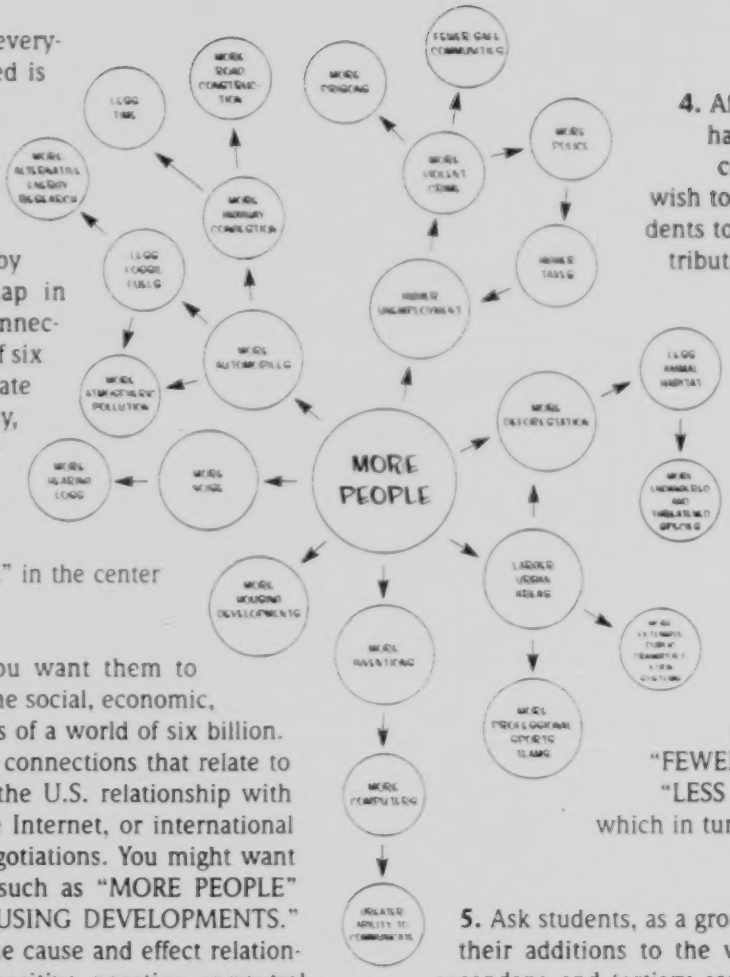
Everything is Connected is Everything is Connected

The concept that everything is connected is often called the "First Law of Ecology." In this exercise, students explore cause-and-effect relationships by building a concept map in which they identify connections between a world of six billion people and the state of society, the economy, and the natural environment.



Procedure

1. Write "MORE PEOPLE" in the center of the chalkboard.

2. Tell students that you want them to think of what might be the social, economic, or environmental impacts of a world of six billion. Encourage them to draw connections that relate to current events, such as the U.S. relationship with China, the growth of the Internet, or international climate change treaty negotiations. You might want to provide an example, such as "MORE PEOPLE" might mean "MORE HOUSING DEVELOPMENTS." Let students know that the cause and effect relationship they propose can be positive, negative, or neutral.

3. Invite students to add to the word web. They may add to the central concept "MORE PEOPLE," or add onto what someone else has contributed. For each concept that a student adds, he/she should draw arrows to any of the other concepts that form a cause and effect relationship. The object is for the class to create a large and interconnected web.

4. After all the students have had a chance to contribute, you may wish to ask individual students to explain their contributions. As necessary, help them draw connections they may have overlooked. (For example, many medicines are derived from natural sources. Deforestation is destroying the habitat of species, pushing them toward extinction. Thus, "FEWER TREES" lead to "LESS BIODIVERSITY," which in turn leads to "LESS MEDICINE.")

5. Ask students, as a group, to categorize their additions to the web as primary, secondary, and tertiary concerns. The primary concerns would be the ones most deserving of societal attention. As a society, we set priorities for action, but individual students may have differences of opinion about what are the most important issues.

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History of the World: Part 6 Billion

Concept

Just as historical events and advances in science and technology have shaped population trends, population growth over time has also led to changes in lifestyles and community infrastructures. In this activity, students conduct research and write a paper tracing the evolution of one aspect of our present society as it relates to population changes.

Materials

Research materials from the library and/or Internet

Introduction

In the early days of human society, there were few rules governing people's everyday existence. With so few people living in sparsely-populated communities, there was little need for laws to govern how people acquired food, disposed of waste, moved from one area to another, or educated their children. Over the millennia, social structures and environmental management have changed as the human population has grown, necessitating more organization and cooperation. Advances in science and technology have also been spurred on by population growth. We are continually trying to find ways to provide more goods and services more efficiently to meet the needs of our growing population (each year we add approximately 80 million more people to the planet, about three million just to North America). The history of almost every aspect of our present lifestyle can be linked to the demographic history of the world.

Procedure

Assign students the following research project. They are to select one of the topics from the list and trace the evolutionary steps from practices in ancient history (or as far back as they can find data) to the present. They may use research materials from the library and Internet. Their research may result in a written paper or a flow chart plotting progression. In either case, students need to show how and why the changes in practices have been influenced by population changes. For each topic given below, suggested benchmarks give students indications of how they might structure their research and organize their flow charts.

For example, about 12,000 years ago, several cultures shifted from hunting and gathering to farming. There were about 5-10 million people worldwide at that time. Students can then illustrate how significant points in agricultural development, transportation and preservation of food, eating habits, and introduction of new edible species in different parts of the world all have related to population trends.

Suggested Research Topics

Acquiring Food

Benchmarks: hunting/gathering; development of agriculture; discovery of new, edible species like corn or potatoes; irrigation and other technological advances; dietary changes; transportation

Land Transportation

Benchmarks: foot; horse/carriages; railroad system; automobiles; road and interstate systems; traffic laws; emissions testing; gas conservation; light rail/subway/modern public transportation

Waste Disposal

Benchmarks: dump in waterways/bury/burn at home; development of community dumping grounds; sanitary landfills; recycling and composting

Drinking Water

Benchmarks: straight from the source such as a stream; creating wells; indoor plumbing; municipal water treatment

Commerce

Benchmarks: bartering; development of monetary systems; family-owned, local businesses; large "chain" businesses; international trade and global partnerships

Community Development

Benchmarks: villages; towns; cities; metropolitan areas including suburban sprawl; megacities with shantytowns in less-developed countries

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Six Billion Reasons

Concept

Many newsworthy trends and events are related to population pressures. In this activity students diagram news articles to discover "six billion reasons" why population matters.

Introduction

Stories related to our growing world population are often in the news. Sometimes they are straightforward, and speak explicitly about our increasing numbers. Often, though, readers have to carefully analyze stories in order to relate them to population growth. In this activity, students find news articles, and analyze their content in order to develop a matrix which relates the articles to population pressures, examining the causes, effects, and possible solutions.

Procedure

Ask your students to each collect at least two newspaper or magazine articles that can be related to our growing population. Suggest that they use the local library and the Internet. They may also use a summary of a news show or television documentary. The following topics represent just a few of the many that students may wish to use as guides in their search.

- Air pollution in fast-growing cities
- Urban sprawl and the loss of rural areas
- Food and water shortages around the world
- Legislation to provide insurance coverage for contraceptives
- Power shifts as populations change
- Challenges in completing an accurate U.S. Census
- Efforts to establish nature reserves in developing countries
- Traffic congestion and "road rage"
- Overfishing

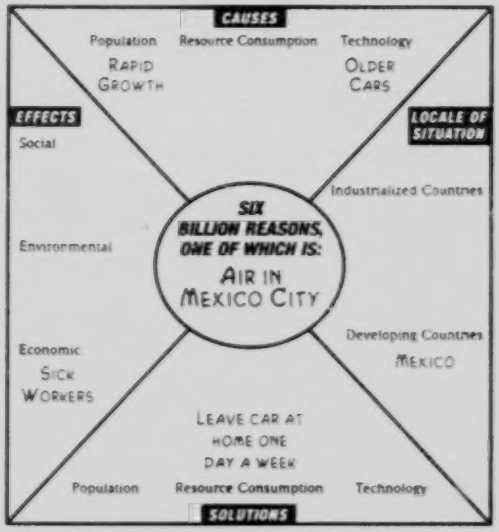
Allow two days for students to collect their articles and/or news summaries. Distribute copies of the student worksheet, and have students diagram the information from their resources.

For example, if an article on air pollution in Mexico City states that the local government has enacted legislation mandating one carless day a week, the student could enter "Mexico" under the "Developing Countries" category in the "Locale" quadrant. The student might note in the "Cause" quadrant that Mexico City, still growing rapidly, is one of the planet's most populous urban areas. Also, drivers in the city use cars without many of the technological devices designed to minimize pollution. The students might recognize environmental effects, such as smog, or social or economic ones, such as health problems and the resultant decrease in worker efficiency. "Leave car at home one day a week" would go under "Resource Consumption" in the "Solutions" quadrant. You may want to chart a sample article with the class so that students understand the concept.

Emphasize that students should include as much information as possible on their chart. While not every category will have something listed, students should be sure that the solutions they include address the causes and effects they have noted. Encourage the students to think of possible solutions that were not necessarily addressed in their articles.

Once the students have completed their individual matrices, draw a large population matrix on the butcher paper or the chalk board. Use this large matrix to summarize information from the students' charts. The middle circle can simply be labeled "Six billion people," rather than trying to list all the article titles.

SAMPLE



Discussion

1. Discuss the proposed solutions: Which seem most feasible? Which seem least feasible? What are the barriers to implementing some of the proposed solutions?

2. Discuss the similarities and differences that emerge: What differences exist between the types of problems students found in heavily industrialized countries compared to those in less developed countries? Are there also differences in the kinds of solutions they seek? What factors contribute to these differences?

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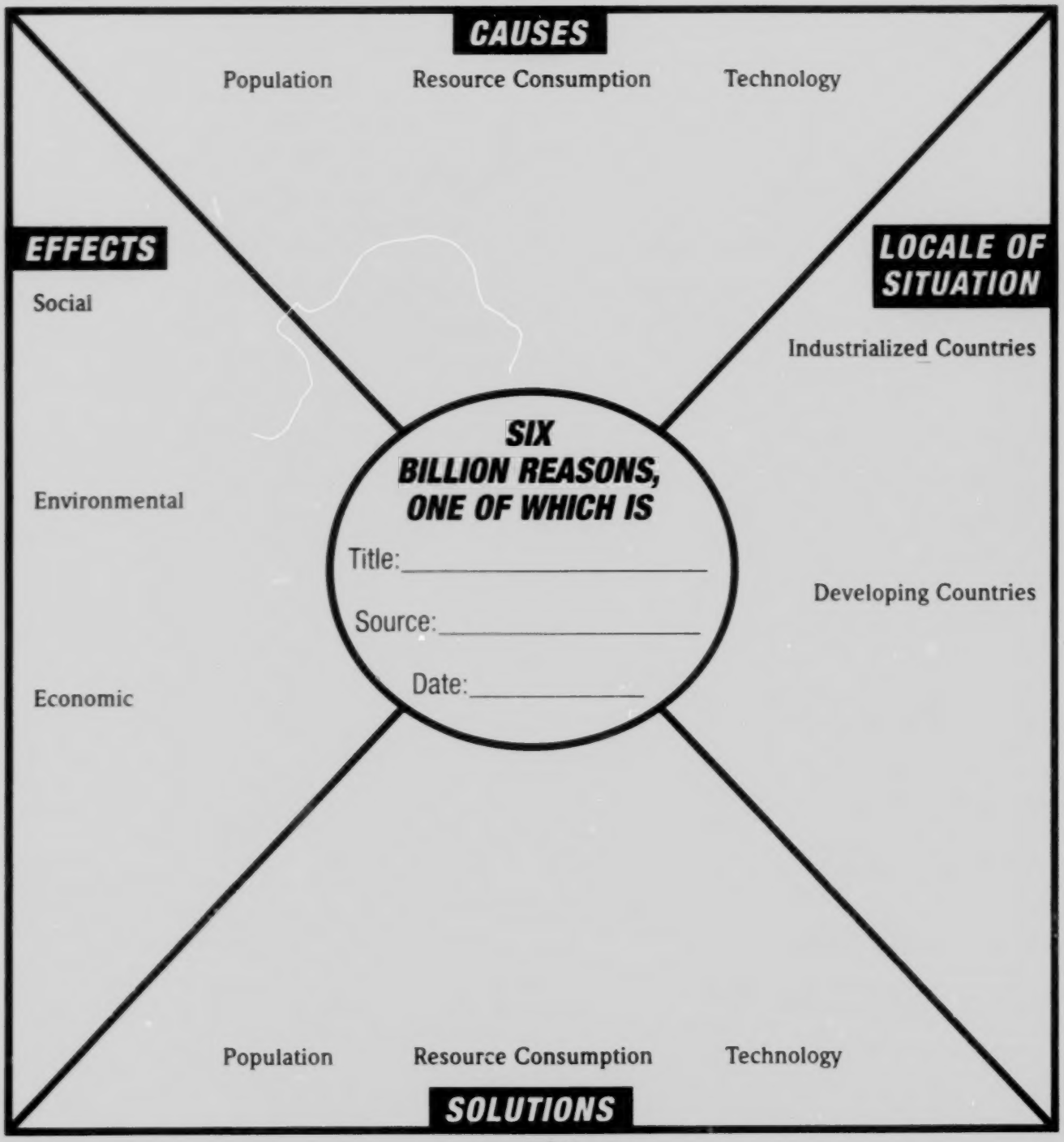
Six Billion Reasons

STUDENT WORKSHEET



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Select Teaching Resources from ZPG

Earth Matters

Studies for our Global Future (2nd Edition)

For grades 9-12.
Our classic high school-level curriculum, newly revised and updated.

"An excellent resource guide!" – California Department of Education and the California Energy Commission, *Compendium for Human Communities* – "A" Rating.

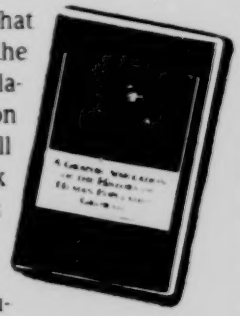
Earth Matters is an interdisciplinary teaching resource that explores some of the most pressing environmental, social and economic issues of our time. Jam-packed with 34 innovative teaching activities and 12 readings, *Earth Matters* helps high school students understand how overpopulation contributes to climate change, air and water pollution, energy consumption, hunger, solid waste woes, deforestation, poverty, the status of women, and more. *Earth Matters* also examines the underlying clashes between economic growth and environmental health.

Most importantly, *Earth Matters* helps prepare students to be global citizens, using critical thinking and creative problem solving techniques.

Price: $22.95 + shipping & handling

World Population Video

Millennium Edition



Educators agree that *World Population* is the best-ever graphic simulation of human population growth. As the years roll by on a digital clock from 1 AD to 2030, dots light up on a world map to represent millions of people added to the population. Historic references on the screen place population changes in context.

As one of our most popular teaching tools, the video is featured in museums, zoos, and aquariums around the country, including the new Hall of Biodiversity at the American Museum of Natural History.

This renowned 7 minute videocassette includes a 12-page activity and discussion guide, including a Spanish translation of the video's narration.

Price: $19.95 + shipping & handling

Nuestro Mundo, Nuestro Futuro (Our World, Our Future)

Spanish is the first language of many new American students. After years of requests from teachers in bilingual classrooms, we have developed *Nuestro Mundo, Nuestro Futuro/Our World, Our Future.* This flip book (one side Spanish, one side English) includes a student reading and seven adapted versions of favorite ZPG activities, exploring natural resource use, global population dynamics, gender equity and personal decision making for our own families and the global family. Written for the middle school classroom, this kit is ideal for the bilingual social studies, science and family life education class, as well as for Spanish or ESL classes for students of all ages.

Price: $3.95 + shipping/handling

Item	Qnty	Unit	Total
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World Population Video		$ 19.95	
Nuestro Mundo, Nuestro Futuro		$ 3.95	
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